Dylan Mumm

STAT 3090 **Project 3** **Fall 2017**

Directions: Please provide any output/screenshots from Minitab or Excel as appropriate. For Minitab/Excel output, **insert the screenshot or image into this document and center it**. **Type your answers below**; use the equation editor for symbols. Answer all questions in your own words. Save the final document as a PDF.

The following table shows the in-state undergraduate in-state tuition and required fees in 2008 and in 2016 for 32 public universities. *Source: collegedata.com*

School	2008 Tuition and Fees ($)	2016 Tuition and Fees ($)
Penn State	13706	18436
Pittsburgh	13642	18618
Michigan	11738	14063
Rutgers	11540	14638
Michigan State	10690	14460
Maryland	8005	10399
Illinois	12106	13705
Minnesota	10634	14417
Missouri	7386	9763
Buffalo	6385	9828
Indiana	8231	10533
Ohio State	8679	10591
Virginia	9300	16781
California-Davis	9497	14382
California- Berkeley	7656	13928
California- Irvine	8046	15516
Purdue	7750	9992
California- San Diego	8062	14028
Oregon	6435	11571
Wisconsin	7569	7878
Washington	6802	10974
UCLA	8310	13749
Texas	8532	10136
Nebraska	6584	8901
Iowa	6544	8964
Colorado	7278	12061
Iowa State	5524	8636
North Carolina	5397	9005
Kansas	7042	10135
Arizona	5542	11877
Florida	3256	6381
Texas A&M	7844	10403

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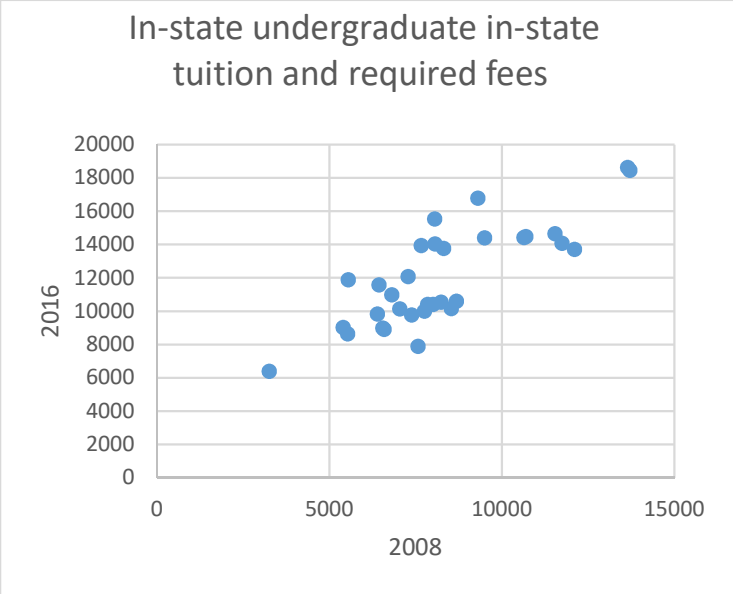
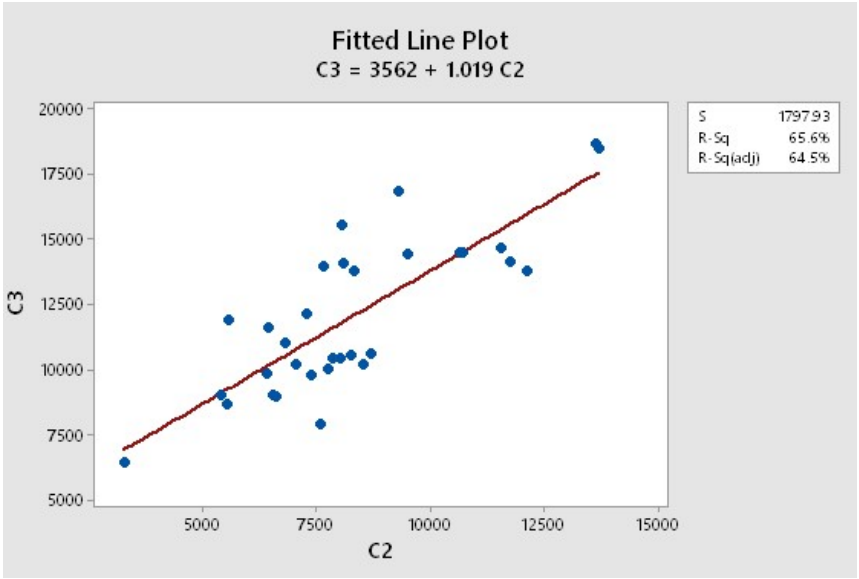
1. Using Excel or Minitab, construct a scatterplot with the 2008 tuition on the x-axis. (2 points)



2. Based only upon your scatterplot, does it appear that the linear model is a reasonable approximation of the data? Comment on the direction and form of the relationship. (1 point)
    a. Yes
    b. The association is linear and positive

3. Using Minitab provide the simple linear regression analysis for predicting a school's 2016 tuition using the 2008 tuition. (2 points)



4. State the slope for the simple linear regression analysis (include an appropriate unit) and interpret this value in this context. (2 points)
    a. $1.019
    b. For every additional dollar that a college costs in 2008, it increases 1.019 in 2016 tuition

5. State the y-intercept for the simple linear regression analysis and interpret, if applicable. (2 points)
    a. $3562
    b. If 2008 tuition is $0, the model predicts the 2016 tuition would be $3562

6. State the standard error of the regression analysis and interpret that value. (2 points)
    a. 1797.93
    b. The average 2016 tuition differs $1979.93 than what the analysis predicts

7. State the coefficient of determination and interpret the value in this context. (2 points)
    a. 65.696
    b. The model explains 65.696% of the variability of the 2016 tuition dataset around its mean

8. State the sum of square errors. (1 point)
    a. 184908911

9. State the standard error of the slope. (1 point)
    a. 0.135

10. Calculate and interpret the 95% confidence interval for slope. (2 points)
    a. (0.744, 1.294)
    b. We are 95% confident that the population slope of the regression line using 2008 tuition to predict 2016 tuition falls between 0.744 and 1.294

11. From the coefficient of determination, standard error of regression, and the confidence interval for slope does that model appear to fit well? Explain clearly. (2 points)
    a. Yes, as 0 does not fall within the confidence interval for slope.

12. Suppose that the tuition at Business Stat University was $8800 in 2008. Using your model, what is the predicted tuition in 2016? Comment on the appropriateness of using this model to make this prediction. (1 point)
    a. $12529.20
    b. As the r^2 is large, the standard error is relatively small, and 0 is not within the confidence interval, it is appropriate to use the model.